BELLCOMM, INC.
955 L'ENFANT PLAZA NORTH, S.W. WASHINGTON, D.C. 20024

B70 06009

SUBJECT: Skylab and Apollo Launch Constraints - Case 320

DATE: June 3, 1970

FROM: A. W. Starkey

ABSTRACT

An examination is made of KSC facility utilization with a view of possible interleaving of Apollo and Skylab launches.

At present, Skylab 1 (Saturn V Dry Workshop) has a planned launch date of July 15, 1972 and a committed launch date of November 1972. July 15 is used in this analysis as the launch date for SL-1, however, the use of this date does not affect the resultant constraints on an Apollo launch prior to, during or following the launch of SL-1 through SL-4. SL-2 is scheduled to be launched one or two days after SL-1. SL-3 and SL-4 are scheduled to be launched three and six months after SL-2, respectively. The Skylab Saturn IB/CSM vehicles (SL-2, SL-3 and SL-4) will be launched from LC-39 and will require the use of the Mobile Service Structure. The MSS will not be required for SL-1.

An analysis of the interactions in launch facility utilization for Apollo and Skylab including SL-1 through SL-4 leads to the following conclusions:

- The use of the MSS for the Skylab IB launches precludes interleaving an Apollo launch between the Skylab launches (i.e., SL-1 through SL-4).
- The MSS and Pad A constrain an Apollo launch from no later than three months before the SL-1 launch.
- The MSS and altitude chambers constrain an Apollo launch to no earlier than nine months after the SL-1 launch.
- The Apollo launch constraints are independent of the SL-1 launch date.

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MEMORANDUM FOR FILE

INTRODUCTION

KSC facility utilization with a view of possible interleaving of Apollo and Skylab launches is examined. This examination is one made in the process of continuing study of Apollo and Skylab Program options.

SKYLAB LAUNCH CONSTRAINTS

At present, Skylab 1 (Saturn V Workshop) has a planned launch date of July 15, 1972 with a committed launch date of November 1972. An assumed July 15 (no year) launch date for SL-1 is used in this analysis, however, the use of this date does not affect the resultant constraints on Apollo launches prior to, during or following the launch of SL-1 through SL-4.

The launch of SL-2 (Saturn IB/CSM) is planned one or two days after launch of SL-1. The launch of SL-3 and SL-4 (Saturn IB/CSM) are planned three and six months after SL-2 respectively.

USE OF FACILITIES FOR SKYLAB

The decision was made several months ago that the Mobile Service Structure (MSS) will not be used for SL-1. The decision was made on April 29 to launch the SL-2, SL-3 and SL-4 (Saturn IB/CSM) from LC-39. It is planned that Pad B, Firing Room 3, LUT 1 and the MSS will be modified for the launch of Saturn IB vehicles. Pad B, FR 3 and LUT 1 will remain dedicated to Saturn IB vehicles. The MSS will be returned to the Saturn V configuration after the launch of SL-4.

UTILIZATION OF FACILITIES

Chart 1 shows the KSC facility utilization required for the Skylab Program with the launch of SL-1 on an assumed date of July 15. This utilization includes the major facilities of LC-39 required for launch of the SL-1, SL-2, SL-3 and

SL-4 missions* and the time required for modifying the facilities for the launch of the Saturn IB vehicles. It also includes the nominal time required for refurbishment as required for Skylab vehicles or reconfiguration back to the Apollo/Saturn V configuration use when required as in the case of the MSS.

Chart 2 shows the KSC facility utilization required for an Apollo launch. No fixed date is assumed for the Apollo launch. The facility interferences between the Skylab and Apollo launches can be readily determined by superimposing Chart 2 on Chart 1 and moving the Apollo launch date until the interferences occur as was done to develop the following two charts.

Chart 3 shows the earliest facility interference when the launch of SL-1 follows Apollo. Both the MSS and Pad A constrain an Apollo launch later than three months (mid-April) before the mid-July Skylab 1 launch. The altitude chambers in the Manned Spacecraft Operations Building also become a constraint about one week later.

Chart 4 shows the latest facility interference when the launch of Apollo follows SL-1. The MSS and altitude chambers would continue to constrain an Apollo launch for nine months (mid-April) following the mid-July SL-1 launch.

It may be possible to eliminate the altitude chamber interference by earlier spacecraft deliveries and shifting of KSC processing schedules. However, the MSS interference would remain. The MSS is required to support the launches of SL-2, SL-3 and SL-4 vehicles for a total period of approximately 10 months with unused periods of about six weeks between each successive Skylab Saturn IB launch. These six weeks periods between Skylab launches are not long enough to support an Apollo launch, especially with the MSS in the Saturn IB configuration for the Skylab launches.

CONCLUSIONS

- The use of the MSS for Skylab Saturn IB launches on a three month interval precludes the interleaving of an Apollo launch between the Skylab launches (i.e., SL-1 through SL-4).
- The MSS and Pad A constrain an Apollo launch from no later than three months before the SL-1 launch.

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*Facility Utilization and Skylab Processing at KSC, Case 320/620, Memo for File, C. H. Eley III, dated May 12, 1970.

- The MSS and the altitude chambers constrain an Apollo launch to no earlier than nine months after the SL-1 launch.
- The Apollo launch constraints are independent of the SL-1 launch date.

A. W. Starkey

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Attachments
Figures 1-4

KSC FACILITY UTILIZATION FOR SKYLAB

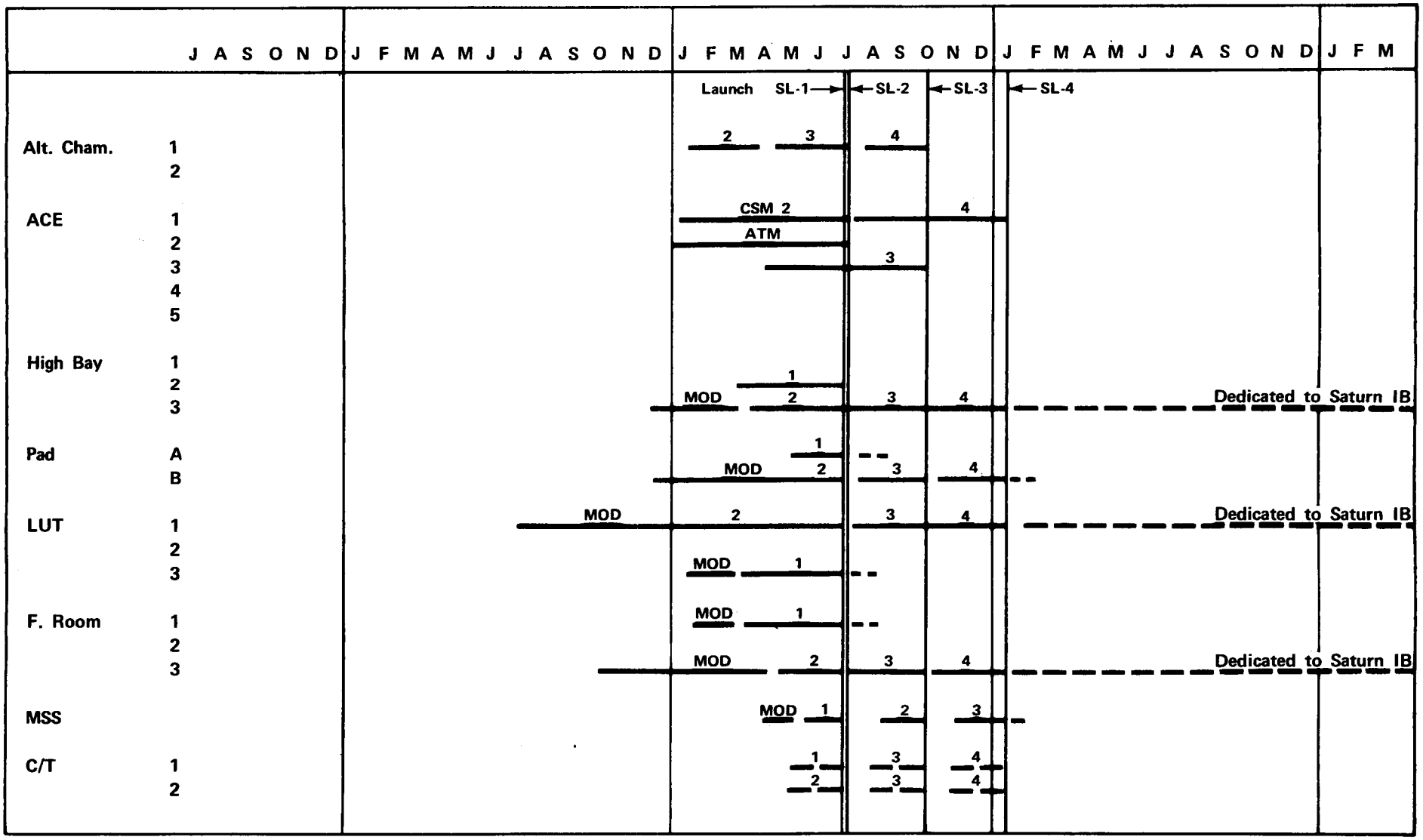

Figure 1

KSC FACILITY UTILIZATION FOR APOLLO

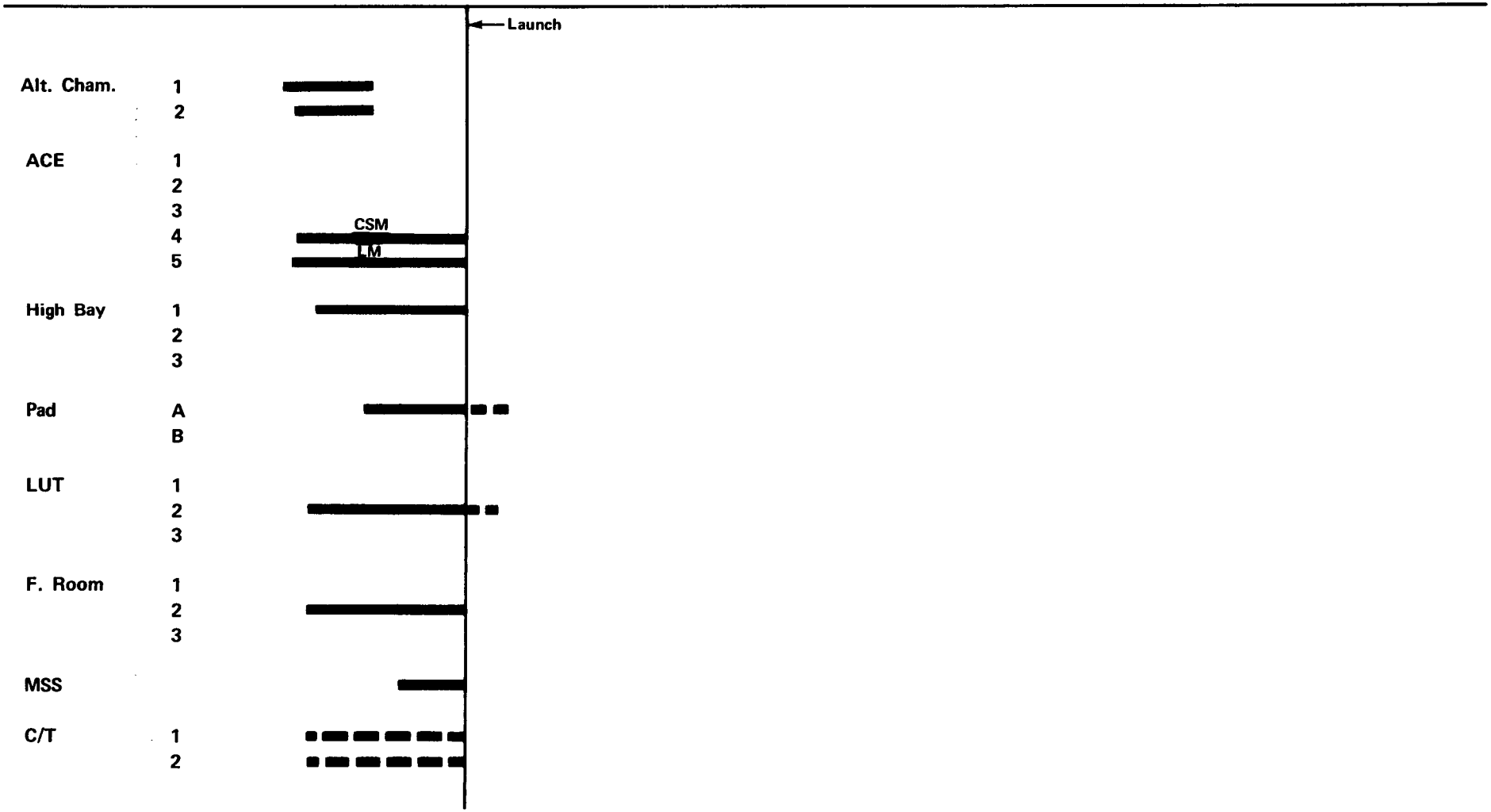

Figure 2

KSC FACILITY UTILIZATION FOR SKYLAB AND APOLLO
SKYLAB FOLLOWING APOLLO

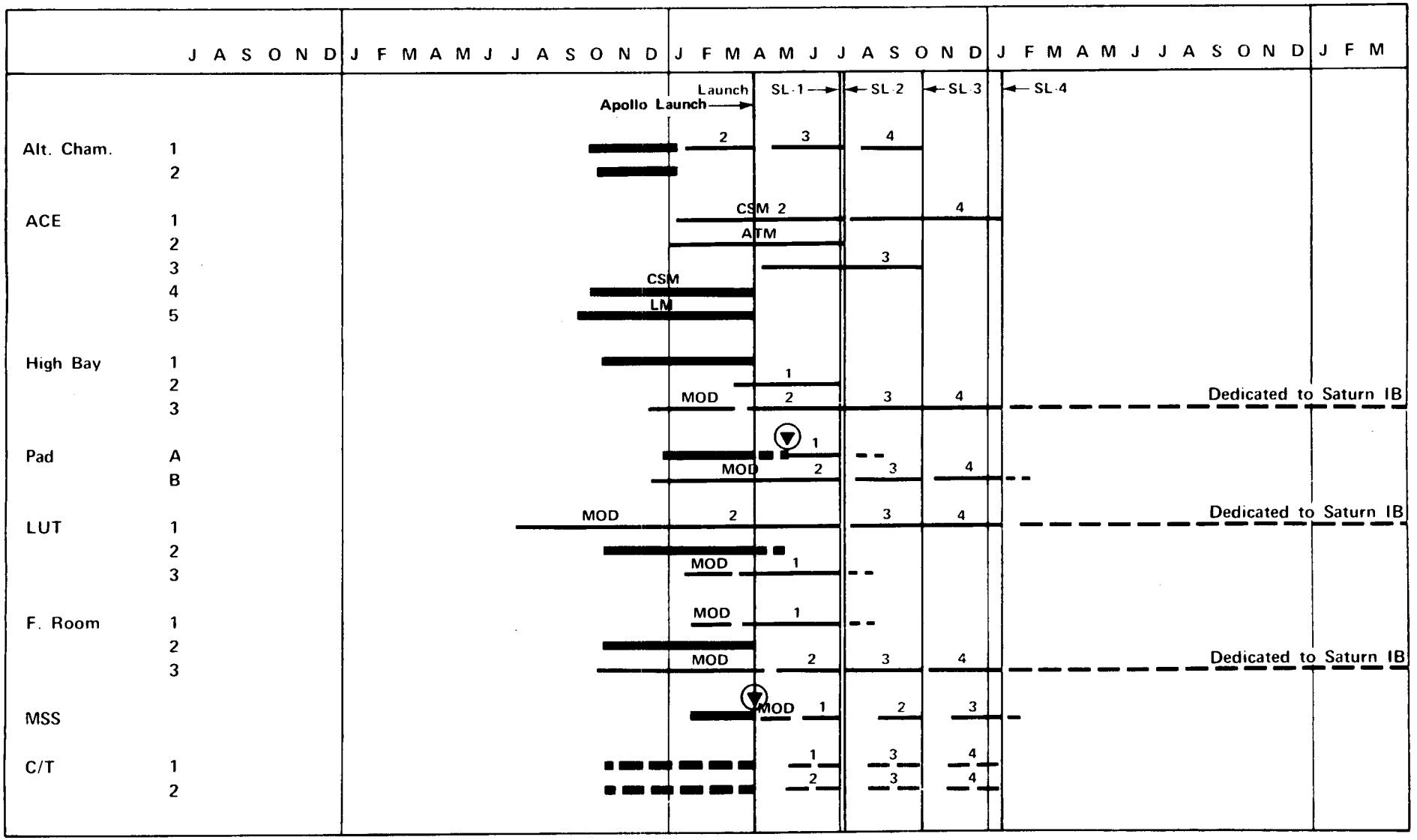

Figure 3

KSC FACILITY UTILIZATION FOR SKYLAB AND APOLLO
APOLLO FOLLOWING SKYLAB

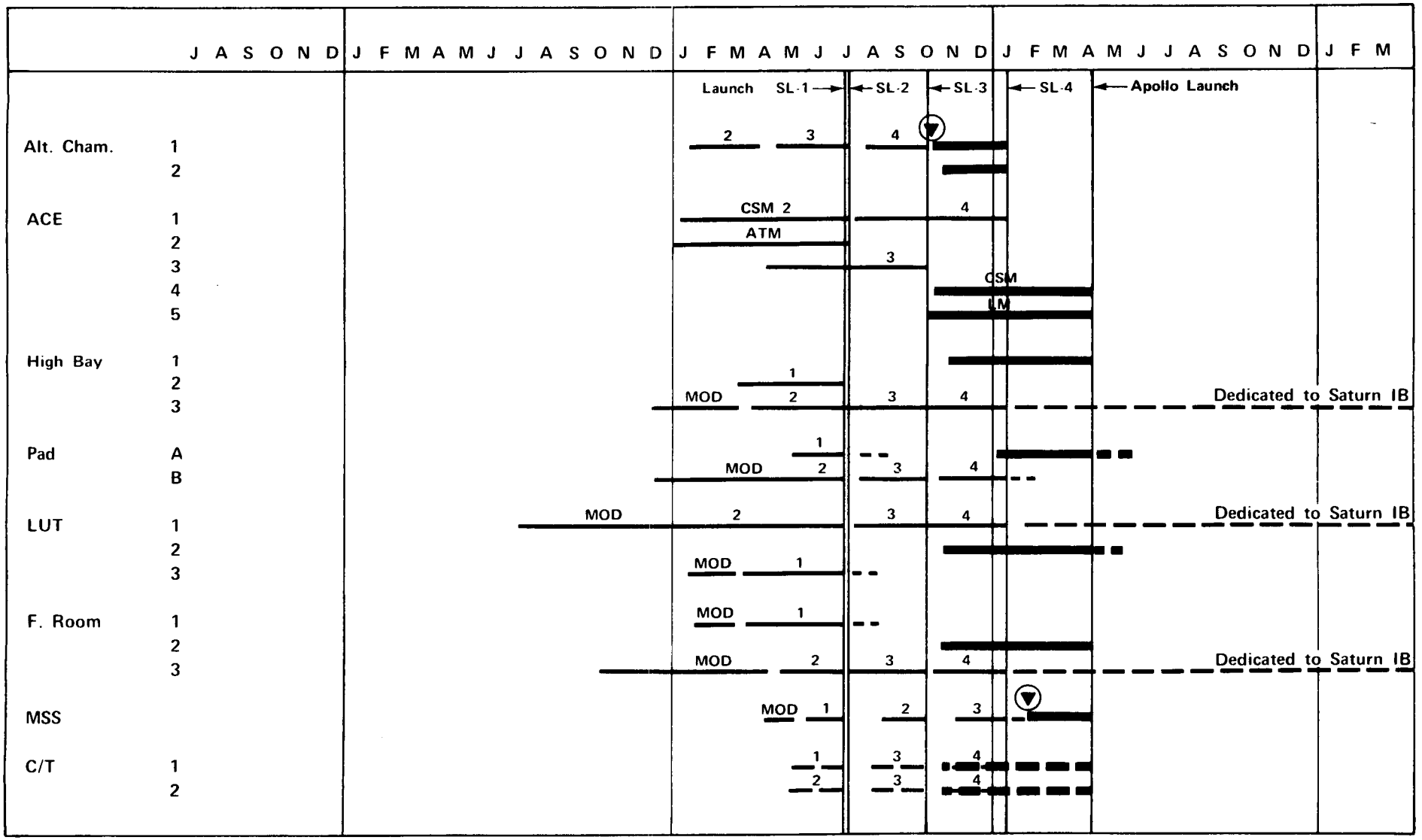

Figure 4

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From: A. W. Starkey

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